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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/609,203	06/26/2003	Tan Tzyy Haw	42P16893	7332

7590 11/06/2006

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EXAMINER
JOHNSON, JONATHAN J

ART UNIT	PAPER NUMBER
1725	

DATE MAILED: 11/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/609,203	HAW ET AL.	
	Examiner	Art Unit	
	Jonathan Johnson	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8 and 10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8,10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 8-11-06
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh (6,564,986) in view of Stewart et al. (US-2003/0170450). Hsieh teaches determining an area of weakness in a ball grid array (BGA) package; first surface coupled with the IC device; a printed circuit board (PCB) having a second surface, the second surface aligned with the first surface using the array of solder balls, wherein the array of solder balls placed in between the first surface and the second surface; and solder joints to attach the array of solder balls with the first surface and the second surface (abstract; column 2, lines 53-64 and Figures); the area of weakness comprises at least one of the following: edges, corners, and perimeter of the BGA package (Figure 3C and column 2, lines 53-64), determining an area of weakness in a ball grid array, (BGA) package (abstract; column 2, lines 53-64 and Figures); determining an area of weakness in a ball grid array (BGA) package (abstract; column 2, lines 53-64 and Figures). Stewart et al. teaches applying a bonder to the area of weakness in the BGA package, which includes directly to the perimeter, wherein the bonder is applied tto solder balls, where the solder balls are between the BGA package (paragraphs 81,109-111,114 and figure 10, item 3); where the bonder is a bonder ball (figure 11, item 5) and the bonder balls are applied surrounding the

solder balls (figure 11, item 5) the bonder comprises at least one of the following: a thermoplastic bonder and a silicon bonder (paragraphs 58,77,81,109-111,114); and applying a thermoplastic bonder to an array of solder balls including in the BGA package independent of the applying of the thermoplastic bonder to the perimeter of the BGA package and (figure 12, item 3) applying a thermoplastic bonder to the area of weakness between a first surface and a second surface in the BGA package (paragraphs 58,77,81,109-111,114); applying a silicon bonder to the area of weakness between a first surface and a second surface in the BGA package (paragraphs 58,77,81,109-111,114); applying the silicon bonder prior to solder reflowing (paragraphs 58,77,81,109-111,114) and where the bonder is applied to one or more edges or corners (figure 12, item 5, 7 and 3). With respect to claims 3-4, the adhesive of Stewart et al. would prevent warpage. At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the defect determining method of Hsieh with the bonder application of Stewart et al. in order to' reinforce a solder ball bond with an adhesive bond when repairing a BGA (Stewart col. 1, pp. 1-10).

Claims 6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh (6,564,986) and Stewart et al. (US-2003/O17045O) as applied to claims 1 and 11 above, and further in view of Austin et al. (6,284,173). Hsieh and Stewart et al. teach all of the limitations of the claims except applying the bonder using a bonder dispenser', the applying of the bonder comprises applying the thermoplastic bonder using a hot melting jig or a dispenser', the applying of the bonder comprises applying the silicon bonder using an epoxy dispenser machine', the independent application of the bonder is performed using software to control placement distance

of the bonder with respect to the array of solder balls. Austin et al. teaches applying the bonder using a bonder dispenser; the applying of the bonder comprises applying the thermoplastic bonder using a hot melting jig or a dispenser; the applying of the bonder comprises applying the silicon bonder using an epoxy dispenser machine', the independent application of the bonder is performed using software to control placement distance of the bonder with respect to the array of solder balls (abstract; column 3, lines 38-62, column 4, lines 29-46, and column 7, lines 41-53). At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the encapsulant dispenser of Austin et al. with the determining method of Hsieh and the bonding method of Stewad et al. in order to precisely position the encapsulant when repairing a BGA.

Response to Arguments

Applicant argues Stewart's mass application is not the same as applying the thermoplastic bonder at the perimeters. The the examiner agrees Stewart, in one embodiment, teaches mass application of solder, the examiner disagrees with applicant's assertion that Stewart does not teach applying the thermoplastic bonder at the perimeters. In the instant case, it is the examiner's position that Stewart teaches applying solder at the perimeters (paragraphs 81,109-111,114 and figure 12, item 5).

Applicant next argues Stewart does not teach applying thermoplastic bonder to solder balls. The examiner disagrees. Stewart teaches applying thermoplastic bonder to the solder balls (figure 10, item 3).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Johnson whose telephone number is 571-272-1177. The examiner can normally be reached on M-Th 7:30 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jonathan Johnson
Primary Examiner
Art Unit 1725

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